EPA Review Comments & Responses
Subsurface Sediment Coring Field Sampling Plan
Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling
Portland Harbor Superfund Site
Draft Document to EPA Dated January 18, 2018

EPA Review Comments dated February 16, 2018 (received 2/21/18)
Pre-RD AOC Group responses dated March 19, 2018 (blue font, italics)

Following are the United States Environmental Protection Agency's (EPA's) comments on the document titled *Subsurface Sediment Coring Field Sampling Plan Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling, Portland Harbor Superfund (*herein referred to as the FSP) prepared by AECOM Technical Services (AECOM) and Geosyntec Consultants, Inc. (Geosyntec) on behalf of Portland Harbor Pre-Remedial Design Group (Pre-RD Group). The FSP was prepared to support the subsurface sediment sampling efforts outlined in the *Pre-Remedial Design Investigation Studies Work Plan* ([PDI Work Plan] Geosyntec 2017).

EPA understands the purpose of the FSP is to provide details on the proposed subsurface sediment coring necessary to ensure the execution of the work will provide the data needed to achieve the project-specific data quality objectives (DQOs) established in the PDI Quality Assurance Project Plan (QAPP). The purpose of EPA's review is to assess if the FSP is consistent with the PDI Work Plan and the DQOs.

EPA's comments are categorized as "Primary," which identify concerns that must be resolved to achieve the objective; "To Be Considered," which, if addressed or resolved, would reduce uncertainty, improve confidence in the document's conclusions, and/or best support the objectives; and "Matters of Style," which substantially or adversely affect the presentation or understanding of the technical information provided in the document.

Primary Comments

1. The text in Section 1.2, Data Quality Objectives (DQOs), must be revised to reference the DQOs in the PDI QAPP rather than restating, or potentially modifying the data quality objectives for subsurface sediment coring in the FSP.

   Pre-RD AOC Group Response: Section 1.2 will be revised to reference the DQOs in the PDI QAPP and state "Data Quality Objectives (DQOs) for subsurface sediment sampling are detailed in Table 3 of the PDI QAPP" and "Criteria for acceptable laboratory QA/QC are described in Section 3 of the Project QAPP, and the analytical suite for the samples is shown in Table 2a in the PDI QAPP (AECOM and Geosyntec 2018a)."

2. A health and safety plan (HASP) or addendum specific to the work under the FSP must be included as an attachment. The *Programmatic HAZWOPER Health and Safety Plan for the Portland Harbor Pre-RD Investigation and Baseline Sampling* states that "Because study area-specific sampling locations, methods, media, and other detailed information are to be developed for each study, safety procedures specific to that field study will be documented as an addendum to this Programmatic HASP. Each HASP Addendum will be included as an attachment to the FSP prepared for the proposed field activity" (AECOM and Geosyntec 2018a). The HASP addendum must cover all activities related to sediment coring activities, including a hazard analysis, safety procedures for working over water and handling acids or solvents used for cleaning sediment sampling equipment, required safety and spill equipment, emergency procedures, and contact information.

Pre-RD AOC Group Response: A task hazard analysis (THA) will be developed for each unique field activity and attached as an addendum to the project HASP. A THA specific to sediment core sampling will be developed and will be provided to EPA a minimum of 1 week prior to the start of field work.

3. While it is justified to utilize methods consistent with previous EPA-approved sampling plans, this FSP must serve as a standalone reference in the field. Accordingly, all appropriate details related to sample collection procedures must be provided in Section 4 of the FSP, and current standard operating procedures (SOPs) must be provided as an appendix. Referencing previous field sampling plans is not sufficient and may lead to confusion in instances in which sampling procedures presented in previous documents are different than those in the FSP. Additionally, it is not practical for field staff to cross-reference multiple sampling plans to obtain details on different aspects of fieldwork. Furthermore, it is unclear if the SOPs referenced in Section 4 conform to current industry standards, and recent versions of SOPs must be used so that changes to industry standards are incorporated into fieldwork.

   Pre-RD AOC Group Response: As per discussions between the Pre-RD AOC Group and EPA during Administrative Settlement Agreement and Order on Consent (ASAOC) negotiation, the FSP utilizes previously approved FSPs and SOPs for the Portland Harbor Superfund Site (Site) to streamline the review and approval process. The Pre-RD Group appreciates EPA's concern for potential inconsistencies or confusion for field staff. Any planned variance from procedures or methods described in the referenced documents are provided in the FSP. Where previous SOPs are cited, the relevant pages for sediment coring will be included as attachments to the FSP to avoid potential confusion for staff. Where appropriate in the FSP, reference to the QAPP will be provided instead of previous SOPs.

4. The FSP must describe what activities will be performed to prevent coring into utilities and infrastructure that may be in the subsurface.

   Pre-RD AOC Group Response: Prior to conducting field activities, a GIS utility map will be generated that includes utilities within Willamette river mile (RM) 1.9 to RM 11.8 and is overlaid with proposed coring stations. For example, one petroleum pipeline crosses the Willamette River at approximately RM 7.7 and one gasoline line crosses the river at RM 2.8, near the Sauvie Island Bridge in the Multnomah Channel. Two sewer lines cross the river, one at RM 7 and the other near RM 10. There should be signage on the banks of the river for all utility crossings. Text will be revised to state "if utilities run within 15 feet of a proposed coring location based on review of GIS maps and confirmed in the field with 'utility crossing' signage, then the coring location will be adjusted a minimum of 15 ft (best professional judgement) and noted in the field notebook."

5. Procedures for handling and disposing of investigation-derived waste (IDW) must be revised. Specifically, the following items must be addressed:

   - Sediment containing non-aqueous phase liquid (NAPL) principal threat waste (PTW) may be collected by the vibracore, or other coring methods, and contact sampling and compositing equipment. The FSP must describe how IDW with NAPL PTW will be managed. Excess sediment containing NAPL PTW must not be returned to the vicinity of the collection site because of potential for release of free product to the water column. Additionally, decontamination procedures must be described for the vessel and sampling equipment to prevent sediment with NAPL residue from washing back into the river.

   Pre-RD AOC Group Response: The FSP will be revised to include the information provided in the next response below. Specifically, the FSP will be revised to state "that no excess sediment containing NAPL PTW will be returned to the vicinity of the collection site; see IDW SOP in Appendix B of this FSP." The SOP is described below.

- Storing and disposing of IDW generated during rinses with nitric acid, methanol, and hexane must be described.

Pre-RD AOC Group Response: Additional details on these IDW concerns will be added to an IDW SOP that will be included in both the Surface Sediment FSP and Subsurface Sediment FSP. The SOP will include the following details on IDW:

- *IDW: IDW management will follow guidance described in the Office of Solid Waste and Emergency Response document, Guide to Management of Investigation-Derived Wastes (EPA 1992). This guidance discusses factors to consider as part of an IDW management program. These factors include protectiveness of human health and the environment, compliance with applicable and relevant or appropriate requirement-based cleanup levels, land disposal restrictions, storage requirements, record keeping and manifesting, and handling of non-Resource Conservation and Recovery Act hazardous wastes. The IDW management program described in this section incorporates these factors in the program.*
- *Sediment: The amount of sediment generated will be minimized to the volume necessary for sampling and analysis, if possible. During field operations, leftover sediment material will be returned to the location it was generated from unless a sheen or NAPL is observed. If sheen or NAPL is observed, sediment on the vessel or laboratory processing area will be temporally stored in 5-gallon buckets with lids, then transferred to 55-gallon drums. Each drum will be labeled using a grease pencil or paint pen to indicate the date sealed, location, and contents. Each of the sealed drums will then be staged at a designated solid waste management unit location for later disposal characterization.*
- *Surface Water: Sampling activities may result in the creation of surface water sheens. Sorbent booms will be deployed if sheen is encountered on the water surface during coring/grab sampling. A small support vessel may be used to manage the boom so the sampling vessel can operate without interruption. AECOM will coordinate with the Office of Spill Prevention Section on additional mitigation measures and agency notifications for releases. Surface water generated during sediment collection will be returned to the river unless a sheen is observed. If a sheen is observed, water will be contained in 55-gallon drums or plastic containers and managed for later disposal characterization.*
- *Personal protective equipment (PPE): Investigation-derived PPE consists of gloves, chemical protective clothing, respirator canisters, and other one-time use equipment used during the field investigation. All used PPE will be containerized in plastic garbage bags and staged on-site for subsequent transport to the municipal landfill.*
- *Decontamination Fluids: At the field laboratory, used decontamination fluids will be drummed up in either 55-gallon drums or disposed of in sanitary sewers if no sheen is observed. Alconox wash waters used on the vessel will be discarded overboard if no petroleum sheen is observed. Nitric acid or other solvent used for decontamination will be collected and contained in tightly sealed 5-gallon buckets for disposal in an approved onshore facility. Alternatively, low-vapor pressure solvents may be evaporated in a well-ventilated open area away from the work zone as per the Surface Sediment SOP (Integral 2004). The decontamination containers will be kept on-site until the water has been analyzed for hazardous materials, at which time the water will be discarded appropriately.*

6. Section 2.1: This section must include a summary of Post RI/FS subsurface sediment core sampling to provide context for inclusion of these previous sample locations on Figures 3a through 3h.

Pre-RD AOC Group Response: Section 2.1 will be revised to include the following text, "Post RI/FS sampling was conducted by multiple parties along the Willamette River between RM 1.9 and RM 11.8. These investigations were supplementary to the RI/FS and are discussed in the ASAOC Work Plan. Details on core locations were not available for many of these studies, and they were not used in locating cores for the PDI

investigation. As additional details on these post-RI/FS studies become available, information will be included in the data analysis phase."

7. Section 2.2, page 4, bullet 4, No Subsurface Data: The core locations at areas with no subsurface data must be sampled as specified in the PDI Work Plan. The reason that the sediment cores are being advanced at these locations is to confirm or update the mapping of sediment contamination as presented in the record of decision. Without advancing these cores, there is no way to determine if the mapped area of contamination is due to "contouring artifacts within the GIS program and may not represent actual areas of subsurface contamination."

   Pre-RD AOC Group Response: We do not agree with EPA on this issue. By design, the remedial footprint is expected to have contouring artifacts because it was determined by stacking depth-integrated GIS layers following the Record of Decision (ROD) Decision Tree. These contouring artifacts or "slivers" may not represent true contamination or implementable remedial footprints. After review and mapping of new 2018 baseline surface sediment conditions, if critical areas exist without any subsurface data, then these samples can be confirmed by others during the 100% remedial design phase. Based on the current Conceptual Site Model, the FSP text will remain as is, stating "However, these small areas may be contouring artifacts within the GIS program and may not represent actual areas of subsurface contamination. These areas will be reviewed in more detail and discussed with EPA after collection of 2018 sediment data. Data gaps will be identified for future design phases."

8. Section 2.2.2, page 6, paragraph 1: The FSP must explain the process for modifying core sample locations "based on the bathymetry, surface sediment sampling work, contouring artifacts, or other additional information" and communicating the proposed changes to EPA. EPA will require review of changed locations and technical justification prior to approval.

   Pre-RD AOC Group Response: Significant changes to the proposed core locations are not anticipated. Minor modifications to the proposed location of a small percentage of the cores may occur for the reasons described in the FSP. EPA will be notified of these changes. The communication strategy with EPA will follow Section 2 of the QAPP (AECOM and Geosyntec 2018a). These potential and minor modifications are not expected to diminish the sampling program objectives."

9. Section 2.2.2, page 6, paragraph 2: The core sample collection depth requires clarification on how driven depth versus recovered length will be addressed and how the 2-foot sample intervals will be determined. The vibracore method has the potential to result in sample recovery that is less than the actual driven depth due to vibration, compaction, or loss of core; therefore, the procedure for determining sample depths when the core recovery is not 100% of driven depth must be clarified. On the Sediment Core Processing Log in Appendix A, the columns Recovered Length (ft), % Compaction, and Insitu Actual Depth (ft) and Sample Depth (ft) need further explanation on how they will be determined.

   Pre-RD AOC Group Response: Recovered depth can be less than the drive depth, and that is why we have included core acceptance criteria in the FSP (consistent with the RI). A formula for calculating the percent compaction will be added to the core processing field form. It is the recovered depth divided by the drive depth.

   Section 2.2.2, paragraph 2, will be edited to state the following: "Subsurface core samples will be visually logged and processed at 2 ft continuous intervals (based on the recovered depth), along the entire length of the accepted core, unless core stratigraphy indicates otherwise (see discussion in Section 4.4). The minimum sample interval will be 1 ft thickness of actual core material." Note that our intent is to collect 2-foot intervals based on recovered core depth."

10. Section 2.2.3, page 6, paragraph 4: This section incorrectly states that the sample identification scheme for the subsurface sediment samples will contain a three-letter sample matrix code. The unique ID's for the subsurface sediment samples must contain the two-letter sample matrix code "SC." The sample ID's referenced in the FSP must be consistent with the QAPP (AECOM and Geosyntec 2018b).

    Pre-RD AOC Group Response: The FSP will be revised to correct the sample identification scheme for the subsurface sediment to contain the two-letter matrix code "SC" consistent with the QAPP.

11. Section 2.2.3, page 7, paragraph 2: The unique sample identification example that is provided is incorrect. The sample ID must contain the letter "S" to designate the unique sequential station number. The sample ID's referenced in the FSP must be consistent with the QAPP (AECOM and Geosyntec 2018b).

    Pre-RD AOC Group Response: The FSP will be revised to correct the sample identification scheme for the subsurface sediment so that the station number includes the letter "S" consistent with the QAPP.

12. Section 2.4, page 7, bullet 1: This section states that "a portion of the fine-grained material may be submitted for additional geotechnical properties using Atterberg Limits test (ASTM D4318)." The specific proportion of sample to be collected for the Atterberg Limits test and/or specific sample criteria that would require this test must be included in this section.

    Pre-RD AOC Group Response: Bullet 1 of Section 2.4 will be revised to state the following, "If a sample is determined to contain greater than 50% fines, then it may be submitted for additional geotechnical properties using Atterberg Limits test (ASTM D4318). The PDI study will target about 10 to 20 samples for testing with spatial coverage of the Site (1 or 2 per river mile or per segment) and vertical coverage in the subsurface (2 to 4 ft depth, and 4 to 6 ft depth)."

13. Section 2.4, page 8, bullet 2: Clarification is needed of when sample intervals based on stratigraphy will be collected. The statement, "cores will be processed for analytical testing at 2 ft intervals, unless strong stratigraphy indicates otherwise," is ambiguous and may result in confusion for the field sampling team as to when to collect a sample for analysis. Definitive criteria, such as stratigraphic unit thickness or soil type, must be provided to direct the field sampling team on when to break out a stratigraphic sample for analysis.

    Pre-RD AOC Group Response: We believe the text as written is the typical level of detail provided in a sediment FSP. Text will be revised in Bullet 1 to state: "Cores will be processed for analytical testing at 2 ft intervals, unless stratigraphy indicates otherwise, consistent with the RI and described in the 2004 Round 2 RI sediment FSP (see Section 4.6.3 subsurface sediment and Appendix E); relevant portions of these plans have been excerpted from the RI and included in Appendix B of this FSP." Text will be added to bullet 2 of Section 2.4 that states, "Stratigraphy changes may include a major observational change in the two dominant grain sizes, depositional regime, or presence/absence of anthropogenic material/indicators such as sheen, NAPL, or debris."

    For EPA's information, the 2004 Sediment FSP stated "The boundaries of lithologic units will be determined primarily by changes in the top two dominant grain sizes estimated visually (e.g., a change from a silty sand to a gravelly sand or to a sandy silt)." Regarding minimum and maximum sample interval thicknesses, pages 14-16 of the FSP stated (paraphrased): "Sample intervals from each core will consist of individual lithologic units that are at least 1 foot thick (2 feet thick minimum for FS cores) below the 0- to 30-cm surface sample. . . Lithologic units less than 1 foot thick (2 feet thick minimum for FS cores) will be combined with the adjacent unit above or below, whichever is considered appropriate by the chief field geologist. . . The individual sample intervals will range up to an approximate maximum of 4 feet in thickness. Lithologic units greater than 4 feet

thick will be divided into subsamples, with interval lengths to be determined at the discretion of the sampling personnel based on total length of the unit and field observations." This section will either be referenced in the FSP or excerpted and included.

14. Section 3.3, page 9, paragraph 3: The Pre-RD Group must be prepared at all times for the collection of split samples during the subsurface sediment sampling, per EPA direction. Coordination by the Pre-RD Group to accommodate an EPA representative onboard the sampling vessel and at the core processing facility must occur prior to field mobilizations.

    Pre-RD AOC Group Response: Understood. The Pre-RD AOC Group is prepared to collect and provide split samples to EPA upon request.

15. Section 4.1, page 9, paragraph 6: The criteria for when to use Lexan versus aluminum sample liners must be presented in the FSP. Clarification is needed for when a decision will be made to use the mechanical piston-type device in the core barrel.

    Pre-RD AOC Group Response: Section 4.1, paragraph 6, will be revised to include the following text, "Lexan sample liners are sturdier and do not bend as easily compared to aluminum sample liners; therefore, Lexan sample liners will be used in areas where compacted sediments and/or cobbles/debris are expected. A mechanical piston corer may be used when continued refusal or inadequate recovery is experienced."

16. Section 4.3, page 12, bullet e: The sediment core acceptance criteria of "+/- 2 feet of target" must be clarified. A core that falls 1 to 2 feet short of the target depth may be unacceptable if it is due to difficult drilling conditions, such as refusal on cobbles or debris. However, if the core encounters bedrock, then it would be acceptable to terminate prior to the target depth. In the former case, advancing an additional core per the contingency plan in Section 4.3.1 or consultation with EPA will be needed. There may be reason to advance cores more than 2 feet over the target depth in situations in which obvious contamination is observed at the target depth of the core.

    Pre-RD AOC Group Response: Section 4.3.2, bullet e, in the FSP will be revised to state, "Target penetration depth has been achieved or bedrock is encountered. If target depth is not reached due to cobbles, debris, refusal, or other difficult drilling conditions then an additional core will be attempted as described in the contingency plan (see Section 4.3.1). If NAPL is observed at depth in a core, then EPA will be notified."

17. Section 4.4, page 12, bullet 3: The FSP must describe in detail the alternate method to be used for core extraction when a core exhibits evidence of an oily product.

    Pre-RD AOC Group Response: Bullet 3 will be deleted. Previous Bullet 2 will be revised to state: "The core tube will be cut open longitudinally using a table saw, hand-held circular saw, shearing tool, or similar device, according to the methods described in the RI Round 2 FSP (Integral 2004). New Bullet 3 will be revised to state: "The core tube will be split open to preserve the material stratigraphy inside the core tube and visually described following ASTM visual soil classification procedures. A logging key is provided in Appendix A."

18. Section 4.4, page 12, bullet 4: The ASTM method number for the visual soil classification procedures must be provided.

    Pre-RD AOC Group Response: The FSP will be revised to include ASTM D-2488 - Standard Practice for Identification of Soils (Visual-Manual Procedure). A copy of the ASTM method will not be provided in the

appendix but will be referenced in the text as stated above, and a United Soil Classification System (USCS) table will be included as an attachment to the FSP.

19. Section 4.4, page 13, bullet 6: The FSP includes collection of field shear strength, compressive strength measurements, and laboratory testing for Atterberg limits. Accordingly, the PDI QAPP must be updated to include DQOs and testing methodology related to collection of geotechnical data from the sediment cores.

    Pre-RD AOC Group Response: We partially agree with this comment. Hand-held torvane (sheer strength) and pocket penetrometer (compressive strength) are field parameter tools to semi-quantitatively assess material properties. The PDI QAPP does not discuss field observations/parameters (for example, the QAPP does not include a discussion of a photoionization detector). We will follow manufacturer's instructions for use.

20. Section 4.4, page 13, bullet 10: A procedure for collecting photoionization (PID) headspace measurements must be included in the FSP. The procedure must specify PID calibration requirements and how the headspace measurement will be obtained (e.g., what container will the headspace measurement be obtained from and how long is the equilibration time). PID headspace measurements must be collected prior to homogenization to prevent volatile loss.

    Pre-RD AOC Group Response: The FSP will be revised to include text stating "The PID will be used for pre-screening of each core. As soon as the core is split open, the PID monitor will be held in the ambient air space just above the open core and slowly moved down the core from top to bottom. PID readings will be recorded in the field notebook. If there is a "PID hit" or if sheens/petroleum-like odors are suspected, then a headspace screening will be conducted following procedures described in the RI Round 2 FSP (Integral) Section 4.6.4 field screening; this section has been excerpted from the RI and included in Appendix B of this FSP. Calibration will follow manufacturer's instructions."

21. Section 4.7, page 14, paragraph 2: Decontamination procedures for the vibracore and other sediment coring tools must be described in the FSP.

    Pre-RD AOC Group Response: See response to comment #3.

22. Section 5, page 15, paragraph 3: The procedures for measuring shear strength using a field torvane and strength using a pocket penetrometer must be described to ensure field measurements are performed uniformly between field staff. The field forms must be revised to include a column for recording the results of shear strength and strength. Additionally, the torvane and pocket penetrometer must be added to the Sediment Sampling Equipment Checklist in Appendix A, along with sorbent booms and pads.

    Pre-RD AOC Group Response: These field tools come with instructions of how to properly use the equipment (similar to a PID); these instructions will not be replicated in the FSP. Field staff will review the manufacturer methods before coring starts, and field teams will have hands-on practice during the kick-off meeting to help provide uniformity among all field staff for all field information. On the field form, shear strength and compressive strength will be recorded in the PID column at the appropriate depth (there is limited space to add more columns). This equipment will be added to the equipment checklist in Appendix A, along with sorbent booms and pads.

23. Appendix A, Sediment Sampling Equipment Checklist: Under safety equipment, an automated external defibrillator and photoionization detector must be listed.

Pre-RD AOC Group Response: In Appendix A, Sediment Sampling Equipment Checklist, automated external defibrillator (AED) will be included under Safety Equipment, consistent with HASP discussions. PID will be included in Appendix A, Sediment Sampling Equipment Checklist, under Tools.

24. Table 1: The proposed core depth for core locations #39 and #288 must be specified, or a discussion of how the targets are to be determined must be provided.

    Pre-RD AOC Group Response: In Table 1, the target depths of proposed core locations #39 and #228 have been added. For core location #39, the target is 15 feet bml, and for core location #228 (no #288 core sample being collected), the target is 15 feet bml.

25. Figure 2e: The footprint of the RM 11E early action area must be included on Figure 2e and referenced in the text in Section 2.2, page 4, paragraph 1, bullet 6.

    Pre-RD AOC Group Response: The FSP will be revised to include the approximate footprint of the RM 11E early action area on Figure 2e, and Figure 2 will be referenced in Section 2.2, page 4, paragraph 1, bullet 6. At this time, we only have a PDF image of this footprint; but are attempting to obtain the GIS files of this footprint to accurately map the area relative to our PDI sample locations.

To Be Considered

1. Section 2.2, page 5, paragraph 1: The sentence "deeper depth intervals will be archived" should be revised to describe more clearly that the deep subsurface sediment cores (0 to 20 ft below mudline) will be archived and where they will be archived.

    Pre-RD AOC Group Response: Section 2.2, paragraph 1, will be updated to state, "Deep core intervals (0 to 20 ft below mudline) may be collected and archived at 1 ft sample intervals from the area expected to be the bottom of contamination. The bottom 2 ft section of retained sediment from the core will also be archived regardless of the target depth. Archiving will be completed in accordance with RI Round 2 FSP (Integral 2004)."

2. Section 2.2.1 and Figures 4a through 4d: This section and the corresponding figures should include a brief description or note of the reason for the presence of sediment core data located at elevations above the mudline, and clarify the difference between bathymetry contours and mudline elevations. Also, if additional cross-sections were developed for deciding where to select subsurface coring locations, they should be provided as an appendix to the FSP.

    Pre-RD AOC Group Response: Figures 4a through 4d will be updated with the following note added to Note 1: "Existing cores that are projected on the cross section may appear above or below the mudline elevation line(s); these are artifacts of the projection. The mudline elevations in the lower panel are drawn from the bathymetric contours in the upper panel."

    Section 2.2.1 will be updated to include text that states, "Figures 4a through 4d show bathymetry contours that follow a set elevation datum (i.e., CRD 2009) in the upper panel; the cross sections, with an associated mudline, are used to project artifacts on a set plane in space in the lower panel."

    The cross-sections were used to illustrate core placement following the decision rules and were not used to locate cores. No additional cross sections were developed to determine where to select subsurface coring locations; therefore, no further information will be provided as an appendix to the FSP.

3. Section 2.2.1, page 6, bullet 1: The bullet describes that seven PDI cores are proposed for Swan Island Lagoon, but 10 PDI cores are shown on Figure 4d. The bullet should be revised to describe all 10 PDI core locations or the figure corrected to show seven locations.

   Pre-RD AOC Group Response: The FSP will be revised to describe the 10 proposed PDI core locations in Section 2.2.1. Figure 4d accurately presents 10 PDI cores in Swan Island Lagoon.

4. Section 2.2.2, page 7, bullet 2: The sentence "Collocated sediment grabs and cores…" should more clearly distinguish between surface sediment grab samples and subsurface sediment core samples.

   Pre-RD AOC Group Response: There are no bullets in section 2.2.2; we assume EPA is referring to Section 2.2.3. The text will be revised to state, "In summary, the identification scheme follows:
   - *Project phase (PDI).*
   - *Sample matrix (SC [sediment core]).*
   - *Unique, sequential station number (S001 to S263). Station numbers are based on placement within the location of the river (from downstream to upstream). Surface sediment grabs (non-random) and cores are all grouped together for numbering purposes."*

5. Section 2.3: The fish tissue FSP states that fish tissue sampling will occur in August/September 2018 (AECOM and Geosyntec 2018c) while the subsurface coring FSP states that it will occur in July/August 2018. This scheduling discrepancy should be corrected or clarified.

   Pre-RD AOC Group Response: The schedules discussed in all of the FSPs will be revised to match the latest master field schedule based on approval of the PDI project plans. The subsurface sediment coring FSP text will be revised to state that coring is scheduled for July 2018.

6. Section 2.4, Key Changes from Previously Approved RI FSPs, page 8, bullet 1: Describes that a jar sheen test will be used at locations where NAPL maybe present and that sorbent booms and pads may be deployed around the coring area. Table 1, Subsurface Sediment Core Rationale, should include a note to indicate which core locations may have NAPL present to help field staff identify when the sheen test needs to be performed and when sorbent booms may need to be deployed.

   Pre-RD AOC Group Response: Table 1 will be updated to include a note indicating which core locations are anticipated to potentially contain NAPL.

7. Section 4.1, page 9, paragraph 4: The manufacturer of the RIC-5500 vibracore system should be provided in this section and listed on the sediment sampling equipment checklist in Appendix A.

   Pre-RD AOC Group Response: Manufacturer/model of the vibracore system will be provided. This is equipment provided by the subcontractor and therefore will not be provided on the equipment checklist.

8. Section 4.2, page 10, paragraph 5: The FSP should describe the quality assurance procedures for checking the accuracy of the on-board fathometer.

   Pre-RD AOC Group Response: There is no paragraph 5 in Section 4.2; we assume EPA is referring to paragraph 2 of Section 4.2. The following text will be included: "The fathometer accuracy will be checked regularly by the subcontractor providing the vessel and calibrated when necessary following ASTM D6318 Standard Practice for Calibrating a Fathometer Using a Bar Check Method or other similar practice."

Matters of Style

1. Section 4.3.1: In the third sentence, "acceptable" should be changed to "acceptance."

   Pre-RD AOC Group Response: This will be addressed, so the new sentence states "If the first core attempt meets the acceptance criteria, then…"

References

AECOM and Geosyntec. 2018a. Programmatic HAZWOPER Health and Safety Plan, Portland Harbor Superfund Site Pre-Remedial Design, Investigation and Baseline Sampling. January.

———. 2018b. Quality Assurance Project Plan, Portland Harbor Pre-Remedial Design, Investigation and Baseline Sampling, Portland Harbor Superfund Site. January.

———. 2018c. Fish Tissue Field Sampling Plan, Portland Harbor Pre-Remedial Design, Investigation and Baseline Sampling, Portland Harbor Superfund Site. January.

EPA 1992. Guide to Management of Investigation-Derived Wastes. United States Environmental Protection Agency, January 1992.

Geosyntec. 2017. Work Plan Portland Harbor Pre-Remedial Design Investigation Studies Portland Harbor Superfund Site. December.

Integral. 2004. Round 2 Field Sampling Plan – Sediment Sampling and Benthic Toxicity Testing Prepared for the Lower Willamette Group (LWG) for submittal and approval by EPA Region 10. June 21.
Section 4.6.3 Subsurface Sediment
Section 4.6.4 Subsurface Sediment Sample Field Screening
Appendix E Sediment Sampling SOPs, Sediment Core Collection and Processing (10 pages)